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### REMARKS

This is a full and timely response to the Final Office Action mailed by the U.S. Patent and Trademark Office on October 5, 2005. Upon entry of the attached amendments, claims 1-19 remain pending in the application. Claims 1, 2, 3, 6, 11 and 16 have been amended. The subject matter of the amended claims is supported in at least the schematic of Figure 3 and the related detailed description. Consequently, no new matter is added to the present application.

The following remarks address each rejection against Applicant's claimed systems and methods. Accordingly, reconsideration and allowance of the application and presently pending claims 1-19 are respectfully requested.

#### **I. Response to 35 U.S.C. § 103 Rejections – Claims 1, 2 and 16-19**

##### **A. Statement of the Rejections**

Claims 1, 2 and 16-19 presently stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 5,327,580 to Vignali et al., hereafter *Vignali*, in view of U.S. Patent No. 6,008,691 to Morita, hereafter *Morita*.

##### **B. Discussion of the Rejections**

Applicant's amended independent claims 1 and 16 are allowable over the proposed combination for at least two reasons. First, the proposed combination fails to establish a *prima facie* case of obviousness because claims 1 and 16 each recite features that are not disclosed by the proposed combination. Second, the proposed combination is improper for at least the separate and distinct reason that the proposed combination of *Vignali* and *Morita* teaches away from features recited in Applicant's claims 1 and 16.

For a claim to be properly rejected under 35 U.S.C. §103, "[t]he PTO has the burden under section 103 to establish a *prima facie* case of obviousness. It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge

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generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references.” *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988) (Citations omitted). Further, to establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant’s disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Further, Applicant notes that the Supreme Court has held that “teaching away” from the claimed invention by the prior art is one important indicium of nonobviousness. *U.S. v. Adams*, 383 U.S. 39, 148 USPQ 479 (1966). The Federal circuit has also held that “teaching away” is strong evidence of nonobviousness. *In re Hedges*, 783 F.2d 1038, 1041, 228 USPQ 685, 687 (Fed. Cir. 1986). Such teaching away should be weighed heavily in determining the nonobviousness of Applicant’s claims.

#### 1. Claims 1 and 2

For convenience of analysis, Applicant’s independent claim 1, as amended, is repeated below in its entirety.

1. A method for filtering a receive signal in a wireless receiver, comprising:  
providing a received signal to an amplifier; and  
filtering the received signal *using a circuit comprising a single frequency dependent negative resistance configured to realize a bi-quad filter electrically isolated from an input of the amplifier such that noise contributed by the circuit is blocked from an output of the amplifier at a first frequency, wherein filtering at the first frequency is performed via a single voltage-to-current conversion and a single current-to-voltage conversion.*

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(Applicant's amended independent claim 1 – *emphasis added*.)

Applicant's amended independent claim 1, as shown, recites features that are not disclosed by the proposed combination. For at least this reason, Applicant's claim 1, as amended, is allowable.

Specifically, the proposed combination of *Vignali* and *Morita* fails to disclose, teach, or suggest Applicant's claimed method wherein "filtering the received signal" is performed "using a circuit comprising a single frequency dependent negative resistance configured to realize a bi-quad filter electrically isolated from an input of the amplifier such that noise contributed by the circuit is blocked from an output of the amplifier at a first frequency." In addition, the proposed combination fails to disclose, teach or suggest "wherein filtering at the first frequency is performed via a single voltage-to-current conversion and a single current-to voltage."

FIG. 2A of *Vignali* illustrates a multi-stage filter comprising FDNR network 50 and FDNR network 52. Each FDNR network performs a separate and distinct current-to-voltage conversion over the range of frequencies from 0 to about 300Hz. Thus, the series combination of FDNR network 50 and FDNR network 52 performs multiple current-to-voltage conversions over the range of frequencies from 0 to about 300Hz. Consequently, noise introduced by FDNR network 52 is added to noise introduced by FDNR network 50 and amplified by amplifier 62.

*Morita* discloses multiple embodiments of multi-stage filters wherein a first voltage-to-current converter and current-to-voltage converter pair is series coupled to a second voltage-to-current converter and current-to-voltage converter pair, the output of which (either at that stage or a subsequent even-numbered stage) is applied to the input of the first voltage-to-current converter and current-to-voltage converter pair forming a feedback loop. Consequently, noise introduced during the first voltage-to-current and

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current-to-voltage conversions is applied to and amplified by the second voltage-to-current converter and current-to-voltage converter pair.

A single voltage-to-current conversion is a solitary voltage-to-current conversion. That is, it is not accompanied by other voltage-to-current conversions. Similarly, a single current-to-voltage conversion is a solitary current-to-voltage conversion. That is, it is not accompanied by other current-to-voltage conversions.

Accordingly, the proposed combination of *Vignali* and *Morita* does not disclose, teach, or suggest “filtering at the first frequency is performed via a single voltage-to-current conversion and a single current-to-voltage conversion.” For at least the reason that the proposed combination fails to disclose, teach, or suggest this feature of claim 1, the proposed combination fails to establish a *prima facie* case of obviousness regarding Applicant’s independent claim 1.

In addition, because both *Vignali* and *Morita* include series-coupled filters, the proposed combination of *Vignali* and *Morita* does not disclose, teach, or suggest a circuit configured “such that noise contributed by the circuit is blocked from an output of the amplifier at a first frequency.” For at least the reason that the proposed combination fails to disclose, teach, or suggest this feature of claim 1, the proposed combination fails to establish a *prima facie* case of obviousness regarding Applicant’s claim 1.

Furthermore, the multi-stage filters apparently disclosed in *Vignali* and *Morita* fail to disclose, teach, or suggest “using a circuit comprising a single frequency dependent negative resistance configured to realize a bi-quad filter electrically isolated from an input of the amplifier.” *Vignali*, as shown above, discloses multiple FDNRs coupled in series. Accordingly, *Vignali* “teaches away” from claim 1, which comprises “a single frequency dependent negative resistance.” For at least the reason that *Vignali* teaches away from Applicant’s claimed method, the proposed combination does not establish a *prima facie* case of obviousness regarding Applicant’s claim 1.

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Moreover, *Morita*, as shown above, discloses multiple-stage filters with feedback originating from the output of even-numbered stages. Accordingly, *Morita* “teaches away” from claim 1, which comprises “a bi-quad filter electrically isolated from an input of the amplifier.” For at least the reason that *Morita* teaches away from Applicant’s claimed method, the proposed combination does not establish a *prima facie* case of obviousness regarding Applicant’s claim 1.

Applicant’s independent claim 1 is allowable for at least the separate and distinct reasons cited above. Because independent claim 1 is allowable, dependent claim 2, which depends directly from claim 1, is also allowable. *See In re Fine*, 837, F.2d 1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Accordingly, Applicant respectfully requests that the rejection of claims 1 and 2 be withdrawn.

## 2. Claims 16-19

For convenience of analysis, Applicant’s independent claim 16, as amended, is repeated below in its entirety.

16. A portable transceiver, comprising:  
means for modulating a data signal;  
means for upconverting the modulated data signal and  
provide a radio frequency (RF) signal;  
means for transmitting the RF signal;  
means for converting a received signal to a baseband  
signal; and  
*means for filtering the baseband signal so that noise  
generated by the filter means is prevented from  
appearing on the received signal at a first frequency, the  
means for filtering comprising a single frequency  
dependent negative resistance configured to realize a bi-  
quad filter electrically isolated from an input of the  
amplifier, wherein the means for filtering performs a  
single voltage-to-current conversion and a single  
current-to-voltage conversion.*

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(Applicant's amended independent claim 16 – *emphasis added*.)

Applicant's amended independent claim 16, as shown, recites features that are not disclosed by the proposed combination. For at least this reason, Applicant's claim 16, as amended, is allowable.

Specifically, the proposed combination of *Vignali* and *Morita* fails to disclose, teach, or suggest Applicant's claimed portable transceiver, which comprises “means for filtering the baseband signal so that noise generated by the filter means is prevented from appearing on the received signal at a first frequency, the means for filtering comprising a single frequency dependent negative resistance configured to realize a bi-quad filter electrically isolated from an input of the amplifier, wherein the means for filtering performs a single voltage-to-current conversion and a single current-to-voltage conversion.”

FIG. 2A of *Vignali* illustrates a multi-stage filter comprising FDNR network 50 and FDNR network 52. Each FDNR network performs a separate and distinct current-to-voltage conversion over the range of frequencies from 0 to about 300Hz. Thus, the series combination of FDNR network 50 and FDNR network 52 performs multiple current-to-voltage conversions over the range of frequencies from 0 to about 300Hz. Consequently, noise introduced by FDNR network 52 is added to noise introduced by FDNR network 50 and amplified by amplifier 62. The combined noise generated by the FDNR networks appears on the received signal. Thus, *Vignali* is in direct contrast with Applicant's claimed portable transceiver.

*Morita* discloses multiple embodiments of multi-stage filters wherein a first voltage-to-current converter and current-to-voltage converter pair is series coupled to a second voltage-to-current converter and current-to-voltage converter pair, the output of which (either at that stage or a subsequent even-numbered stage) is applied to the input of the first voltage-to-current converter and current-to-voltage converter pair forming a

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feedback loop. Consequently, noise introduced during the first voltage-to-current and current-to-voltage conversions is applied to and amplified by the second voltage-to-current converter and current-to-voltage converter pair. Thus, *Morita*, like *Vignali*, is in direct contrast with Applicant's claimed portable transceiver.

Accordingly, the proposed combination of *Vignali* and *Morita* does not disclose, teach, or suggest,

“means for filtering the baseband signal so that noise generated by the filter means is prevented from appearing on the received signal at a first frequency, the means for filtering comprising a single frequency dependent negative resistance configured to realize a bi-quad filter electrically isolated from an input of the amplifier, wherein the means for filtering performs a single voltage-to-current conversion and a single current-to-voltage conversion.”

The proposed combination fails to establish a *prima facie* case of obviousness regarding Applicant's claim 16 for at least the reason that the proposed combination fails to disclose, teach, or suggest this feature of claim 16.

In addition, Applicant's portable transceiver comprises a single FDNR configured to realize a bi-quad filter. A single FDNR is a solitary FDNR. That is, it is not accompanied or coupled to other FDNRs as disclosed in *Vignali* and *Morita*. Thus, the proposed combination fails to establish a *prima facie* case of obviousness regarding Applicant's claim 16 for at least the reason that the proposed combination fails to disclose, teach, or suggest a single FDNR configured to realize a bi-quad filter.

Furthermore, *Vignali*, as shown above, discloses multiple FDNRs coupled in series. Accordingly, *Vignali* “teaches away” from claim 16, which comprises “a single frequency dependent negative resistance.” For at least the reason that *Vignali* teaches away from Applicant's claimed portable transceiver, the proposed combination does not establish a *prima facie* case of obviousness regarding Applicant's claim 16.

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Moreover *Morita*, as shown above, discloses multiple-stage filters with feedback originating from the output of even-numbered stages. Accordingly, *Morita* “teaches away” from claim 16, which comprises “a bi-quad filter electrically isolated from an input of the amplifier.” For at least the reason that *Morita* teaches away from Applicant’s claimed portable transceiver, the proposed combination does not establish a *prima facie* case of obviousness regarding Applicant’s claim 16.

Applicant’s independent claim 16 is allowable for at least the separate and distinct reasons cited above. Because independent claim 16 is allowable, dependent claims 17-19, which depend directly from claim 16, are also allowable. *See In re Fine, supra*. Accordingly, Applicant respectfully requests that the rejection of claims 16-19 be withdrawn.

## II. Response to 35 U.S.C. § 103 Rejections – Claims 3-15

### A. Statement of the Rejections

Claims 3-15 presently stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the modified filter apparatus of *Vignali* in view of U.S. Patent No. 4,185,150 to Regan, hereafter *Regan*.

### B. Discussion of the Rejections

Applicant’s amended independent claims 1, 6 and 11 are allowable over the proposed combination for multiple reasons. First, the proposed combination fails to establish a *prima facie* case of obviousness because claims 1, 6 and 11 each recite features that are not disclosed by the proposed combination. Second, the proposed combination is improper for at least the separate and distinct reason that *Vignali*, *Morita* and *Regan* teach away from features recited in Applicant’s claims 1, 6 and 11. Third, the statement of the rejection of claims 3-15 is improper because it fails to describe how the filter apparatus of *Vignali* is modified.



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1. Claims 3-5

Although it is not clear from the statement of the rejection how the filter apparatus of *Vignali* is modified, Applicant assumes that the Office is proposing to combine the teachings of *Vignali*, *Morita* and *Regan*.

Applicant's amended independent claim 1, as shown, recites features that are not disclosed by the proposed combination.

Specifically, the proposed combination of the modified apparatus of *Vignali* and *Morita* fails to disclose, teach, or suggest Applicant's claimed method wherein "filtering the received signal" is performed "using a circuit comprising a single frequency dependent negative resistance configured to realize a bi-quad filter electrically isolated from an input of the amplifier such that noise contributed by the circuit is blocked from an output of the amplifier at a first frequency." In addition, the proposed combination fails to disclose, teach or suggest "wherein filtering at the first frequency is performed via a single voltage-to-current conversion and a single current-to voltage."

FIG. 2A of *Vignali* illustrates a multi-stage filter comprising FDNR network 50 and FDNR network 52. As shown above, the series combination of FDNR network 50 and FDNR network 52 performs multiple current-to-voltage conversions over the range of frequencies from 0 to about 300Hz. Thus, noise introduced by FDNR network 52 is added to noise introduced by FDNR network 50 and amplified by amplifier 62.

As also shown above, *Morita* fails to remedy the failure of *Vignali* to disclose, teach, or suggest "a bi-quad filter electrically isolated from an input of the amplifier such that noise contributed by the circuit is blocked from an output of the amplifier at a first frequency." In fact, noise introduced during the first voltage-to-current and current-to-voltage conversions, as shown in *Morita*, is forwarded to and amplified by the second voltage-to-current converter and current-to-voltage converter pair.

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FIG. 1 of *Regan* illustrates a multi-stage filter comprising FDNR network 30 and FDNR network 31. The series combination of FDNR network 30 and FDNR network 31 performs multiple current-to-voltage conversions over the range of frequencies from 0 to about 300Hz. Thus, noise introduced by FDNR network 31 is added to noise introduced by FDNR network 30 and amplified by amplifier 34.

A single voltage-to-current conversion is a solitary voltage-to-current conversion. That is, it is not accompanied by other voltage-to-current conversions. Similarly, a single current-to-voltage conversion is a solitary current-to-voltage conversion. That is, it is not accompanied by other current-to-voltage conversions.

Accordingly, the proposed combination of the modified apparatus of *Vignali* and *Regan* does not disclose, teach, or suggest that “filtering at the first frequency is performed via a single voltage-to-current conversion and a single current-to-voltage conversion.” For at least the reason that the proposed combination fails to disclose, teach, or suggest this feature of claim 1, the proposed combination fails to establish a *prima facie* case of obviousness regarding Applicant’s dependent claims 3-5, which depend from claim 1.

In addition, because *Vignali*, *Morita* and *Regan* include series-coupled filters, the proposed combination does not disclose, teach, or suggest a circuit configured “such that noise contributed by the circuit is blocked from an output of the amplifier at a first frequency.” For at least the reason that the proposed combination fails to disclose, teach, or suggest this feature of claim 1, the proposed combination fails to establish a *prima facie* case of obviousness regarding Applicant’s dependent claims 3-5, which depend from claim 1.

Furthermore, *Vignali*, as shown above, discloses multiple FDNRs coupled in series. Accordingly, *Vignali* “teaches away” from claim 1, which comprises “a single frequency dependent negative resistance.” For at least the reason that *Vignali* teaches away from Applicant’s claimed method, the proposed combination does not establish a

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*prima facie* case of obviousness regarding Applicant's dependent claims 3-5, which depend from claim 1.

Moreover, *Regan*, as shown above, discloses the series connection of FDNR 30 and FDNR 31. Accordingly, *Regan* "teaches away" from claim 1, which comprises "a single frequency dependent negative resistance." For at least the reason that *Regan* teaches away from Applicant's claimed method, the proposed combination does not establish a *prima facie* case of obviousness regarding Applicant's dependent claims 3-5, which depend from claim 1.

Accordingly, Applicant respectfully requests that the rejection of claims 3-5 be withdrawn.

## 2. Claims 6-10

For convenience of analysis, Applicant's independent claim 6, as amended, is repeated below in its entirety.

6. A low-noise filter for a wireless receiver, comprising:  
an amplifier; and  
*a circuit comprising a single frequency dependent negative resistance* implemented using a general impedance converter to realize a bi-quad filter electrically isolated from the amplifier input, *the circuit configured such that noise generated by the circuit is prevented from appearing on a received signal at a first frequency*, wherein the amplifier and the frequency dependent negative resistance perform a voltage-to-current conversion and a current-to-voltage conversion, respectively at a first frequency.

(Applicant's amended independent claim 6 – *emphasis added*.)

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The proposed combination of references fails to disclose, teach, or suggest at least the emphasized element of pending claim 6 as shown above. Consequently, claim 6 is allowable.

Specifically, the proposed combination of *Vignali* and *Regan* fails to disclose, teach, or suggest Applicant's claimed low-noise filter for a wireless receiver for at least the reason that the references alone or in combination fail to disclose, teach, or suggest, "a filter comprising a single frequency dependent negative resistance," . . . "the circuit configured such that noise generated by the circuit is prevented from appearing on a received signal at a first frequency." A single FDNR is a solitary FDNR. That is, it is not accompanied by or coupled to other FDNRs. Accordingly, the proposed combination cannot render Applicant's claimed low-noise filter for a wireless receiver obvious for at least the reason that the proposed combination does not disclose, teach, or suggest Applicant's claimed filter.

In addition, neither reference discloses, teaches, or suggests a single frequency dependent negative resistance configured such that noise generated by the circuit is prevented from appearing on a received signal at a first frequency. Accordingly, the proposed combination cannot render Applicant's claimed low-noise filter for a wireless receiver obvious for at least the reason that the proposed combination does not disclose, teach, or suggest Applicant's claimed filter, which is configured such that noise generated by the circuit is prevented from appearing on a received signal at a first frequency.

Furthermore, *Vignali*, as shown above, discloses multiple FDNRs coupled in series. Accordingly, *Vignali* "teaches away" from claim 6, which comprises "a single frequency dependent negative resistance." For at least the reason that *Vignali* teaches away from Applicant's claimed filter, the proposed combination does not establish a *prima facie* case of obviousness regarding Applicant's claim 6.

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Moreover, *Regan*, as shown above, discloses the series connection of FDNR 30 and FDNR 31. Accordingly, *Regan* “teaches away” from claim 6, which comprises “a single frequency dependent negative resistance.” For at least the reason that *Regan* teaches away from Applicant’s claimed filter, the proposed combination does not establish a *prima facie* case of obviousness regarding Applicant’s claim 6. Thus, for at least these separate and distinct reasons, Applicant’s independent claim 6 is allowable.

Because independent claim 6 is allowable, dependent claims 7-10, which depend either directly or indirectly from claim 6, are also allowable. *See In re Fine, supra*. Accordingly, Applicant respectfully requests that the rejection of claims 6-10 be withdrawn.

### 3. Claims 11-15

For convenience of analysis, Applicants’ independent claim 11, as amended, is repeated below in its entirety.

11. A portable transceiver, comprising:
  - a modulator configured to receive and modulate a data signal;
  - an upconverter configured to receive the modulated data signal and provide a radio frequency (RF) signal;
  - a transmitter configured to transmit the RF signal;
  - and
  - a direct conversion receiver including an amplifier and a filter, *the filter comprising a single frequency dependent negative resistance* implemented using a general impedance converter to realize a bi-quad filter electrically isolated from the amplifier input *and configured such that noise generated by the filter is prevented from appearing on a received signal at a first frequency*, wherein the amplifier and the frequency dependent negative resistance perform a single voltage-to-current conversion and a single current-to-voltage conversion.

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(Applicant's amended independent claim 11 – *emphasis added*.)

The proposed combination of references fails to disclose, teach, or suggest at least the emphasized element of pending claim 11 as shown above. Consequently, claim 11 is allowable.

Specifically, the proposed combination fails to disclose, teach, or suggest Applicant's claimed portable transceiver for at least the reason that the references alone or in combination fail to disclose, teach, or suggest, "the filter comprising a single frequency dependent negative resistance," . . . "configured such that noise generated by the filter is prevented from appearing on a received signal at a first frequency."

In this regard, both *Vignali* and *Regan* describe the combination of two FDNR networks coupled in series to implement a bi-quad filter. A single FDNR is a solitary FDNR. That is, it is not accompanied by or coupled to other FDNRs. Accordingly, the proposed combination cannot render Applicant's claimed portable transceiver obvious for at least the reason that the references apparently describe circuits with multiple FDNRs.

In addition, the proposed combination fails to disclose, teach, or suggest a filter configured such that noise generated by the filter is prevented from appearing on a received signal at a first frequency. Accordingly, the proposed combination cannot render Applicant's claimed portable transceiver obvious for at least the reason that the proposed combination does not disclose, teach, or suggest Applicant's claimed transceiver.

Furthermore, *Vignali*, as shown above, discloses multiple FDNRs coupled in series. Accordingly, *Vignali* "teaches away" from claim 11, which comprises "a single frequency dependent negative resistance." For at least the reason that *Vignali* teaches away from Applicant's claimed filter, the proposed combination does not establish a *prima facie* case of obviousness regarding Applicant's claim 11.

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Moreover, *Regan*, as shown above, discloses the series connection of FDNR 30 and FDNR 31. Accordingly, *Regan* "teaches away" from claim 11, which comprises "a single frequency dependent negative resistance." For at least the reason that *Regan* teaches away from Applicant's claimed filter, the proposed combination does not establish a *prima facie* case of obviousness regarding Applicant's claim 11. Thus, for at least these separate and distinct reasons, Applicant's independent claim 11 is allowable.

Because independent claim 11 is allowable, dependent claims 12-15, which depend either directly or indirectly from claim 11, are also allowable. *See In re Fine, supra*. Accordingly, Applicant respectfully requests that the rejection of claims 11-15 be withdrawn.


#### CONCLUSION

In summary, Applicant respectfully submits that presently pending claims 1-19 are allowable and the present application is in condition for allowance. Accordingly, a Notice of Allowance is respectfully solicited. Should the Examiner have any comments regarding the Applicant's response or intends to dispose of this matter in a manner other than a Notice of Allowance, Applicant requests that the Examiner telephone Applicant's undersigned attorney.

Respectfully submitted,

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